

CLAIMS

1. A method for the production of a hop extract characterised in that the method comprises the steps of subjecting hops or a hop product to (1) an isomerisation reaction in the presence of water as a solvent and in the presence of an amount of a base and (2) to at least one extraction.

5 2. The method according to claim 1, characterised in that the isomerisation reaction is carried out in water as a solvent.

10 3. The method according to claim 1 or 2, characterised in that the isomerisation reaction is carried out in alkaline conditions corresponding to concentrations of KOH (w/v%) of at least 0.1, preferably at least 0.5, more preferably of at least 1, most preferably of at least 5.

15 4. The method according to any one of claims 1-3, characterised in that, before subjecting hops or a hop product to the at least one extraction and the isomerisation reaction, the hops or the hop product is subjected to an extraction in the presence of liquid or supercritical CO₂ or at least one substantially non-polar organic solvent, followed by recovering the residue containing the extract enriched in prenylated flavonoids.

20 5. The method according to any one of claims 1-4, characterised in that the method further comprises the mixing of an amount of the hop extract obtained by the at least one extraction and the isomerisation reaction with an amount of a hop extract enriched in xanthohumol.

25 6. The method according to any one of claims 1-5, characterised in that the isomerisation reaction and the at least one extraction are continued until an extract is obtained which contains at least 0.15 wt.%, preferably at least 0.33 wt.% of 8-prenylnaringenin and at least 3 wt.%, preferably at least 10 wt.% of xanthohumol.

30 7. The method according to any one of claims 1-6, characterised in that the isomerisation reaction and the at least one extraction are continued until an extract is obtained with a xanthohumol/8-prenylnaringenin ratio of at least 10, preferably at least 30.

8. The method according to any one of claims 1-7, characterised in that the isomerisation reaction and the at least one extraction are continued until an extract is obtained which contains 6-prenylnaringenin and 8-

prenylnaringenin in a ratio (8-prenylnaringenin x 100%)/(8-prenylnaringenin + 6-prenylnaringenin) of at least 50%, preferably at least 60%, more preferably at least 75%.

9. The method according to any one of claims 1-8,
5 characterised in that, as a hop product use is made of a hop product that has been subjected to an additional extraction step with water and/or at least one non-polar organic solvent, followed by recovering the residue containing the extract enriched in prenylated flavonoids.

10. The method according to any one of claims 1-9,
10 characterised in that the at least one extraction is carried out with at least one organic solvent chosen from the group of alcohols, water-based alcohols, ketones, water-based ketones or esters or mixtures thereof or alkaline water.

11. The method according to any one of claims 1-10,
15 characterised in that the isomerisation reaction is carried out at a temperature between the freeze point and boiling temperature of the reaction mixture, preferably at ambient temperature.

12. The method according to claim 11, characterised in that the isomerisation reaction is carried out at a temperature between ambient temperature and 60°C, preferably at a temperature about ambient temperature.

13. The method according to any one of claims 1-12,
20 characterised in that the isomerisation reaction is carried out in inert atmosphere.

14. The method according to any one of claims 1-13,
characterised in that the isomerisation reaction is carried out for a time period between 0.25 and 4 h.

15. The method according to any one of claims 1-14,
25 characterised in that the method further comprises the step of mixing an amount of the enriched hop extract obtained from the at least one extraction and the isomerisation reaction with an amount of a hop extract enriched in a 8-alkylnaringenin, preferably 8-isopentylnaringenin.

16. The method according to claim 15, characterised
30 in that the hop extract enriched in 8-isopentylnaringenin, is obtained with a method comprising the steps of:

- (a) subjecting a hop extract enriched in xanthohumol to an isomerisation reaction to convert xanthohumol to isoxanthohumol;

- (b) subjecting the extract obtained in step (a) to a catalytic hydrogenation reaction to convert isoxanthohumol to dihydroisoxanthohumol;
- (c) subjecting the extract obtained in step (b) to a demethylation reaction to convert dihydroisoxanthohumol to 8-isopentylnaringenin.

5 17. The method according to claim 16, characterised in that the isomerisation reaction in step a) is carried out in alkaline conditions.

10 18. The method according to claims 15-17, characterised in that the hop extract enriched in 8-alkylnaringenin is obtained by addition of an amount of a synthetic 8-alkylnaringenin, preferably an amount of synthetic 8-isopentylnaringenin.

15 19. A hop extract comprising a mixture of 8-prenylnaringenin and 6-prenylnaringenin, wherein the ratio of (8-prenylnaringenin x 100%)/(8-prenylnaringenin + 6-prenylnaringenin) is at least 50%, preferably at least 60%, more preferably at least 75%.

20 20. A hop extract as claimed in claim 19, characterised in that the extract comprises a mixture of xanthohumol and 8-prenylnaringenin, the weight ratio of xanthohumol to 8-prenylnaringenin being at least 10, preferably at least 20, more preferably at least 30.

25 21. A hop extract as claimed in claim 19 or 20, characterised in that the hop extract comprises at least 0.15 % (w/w), preferably at least 0.33% of 8-prenylnaringenin and at least 3 %, preferably at least 10% (w/w) xanthohumol.

21 22. A hop extract as claimed in any one of claims 19-21, characterised in that the hop extract further comprises isoxanthohumol.

25 23. A hop extract as claimed in any one of claims 19-22, characterised in that the hop extract further comprises an amount of 8-alkylnaringenin, preferably 8-isopentylnaringenin.

30 24. Use of the hop extract according to any one of claims 19-23 or the hop extract obtainable with the method of any one of claims 1-18 for the manufacture of a medicament or a phytopharmaceutical in which the possible proliferative activity, due to the estrogenic activity of 8-prenylnaringenin is inhibited (or counteracted) by the antiproliferative activity of xanthohumol.

25 25. Use of the hop extract according to any one of claims 19-23 or the hop extract obtainable with the method of any one of claims 1-

18 for the manufacture of a medicament or a phytopharmaceutical product for the treatment or prophylaxis of any one of conditions, symptoms, complaints or balance of oestrogenic nature.

5 26. Use as claimed in claim 25, whereby the condition, symptom, complaint or disease state caused by the disturbance in hormonal balance of oestrogenic nature is the menopause.

 27. Use of the hop extract as claimed in claim 25, whereby the disease state is osteoporosis.

10 28. Use of the hop extract as claimed in claim 25, whereby the disease state is selected from the group consisting of sex hormone-dependent cancers, cardiovascular diseases, prostate dysfunction, colon cancer.

15 29. A nutritional composition/supplement comprising an amount of the hop extract according to any one of claims 19-23 or an amount of the hop extract obtainable with the method of any one of claims 1-18.

 30. A cosmetic composition comprising an amount of the hop extract according to any one of claims 19-23 or an amount of the hop extract obtainable with the method of any one of claims 1-18.